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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/809,979	03/26/2004	Mark E. Thompson	12992/90701	9637

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EXAMINER	
MOWLA, GOLAM	
ART UNIT	PAPER NUMBER
1795	
MAIL DATE	DELIVERY MODE
07/17/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/809,979	THOMPSON ET AL.	
	Examiner	Art Unit	
	GOLAM MOWLA	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 March 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *07/01/2008*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 1-12, 14-15, and 17-22 are rejected under 35 U.S.C. 102(b) as being anticipated by Lamansky et al. (WO 02/15645; cited in previous office action).

As to claim 1, Lamansky et al. disclose an organic photosensitive optoelectronic device (Organic light emitting devices (OLEDs): see page 7, lines 10-20) along with a series of organometallic compounds (see page 7, lines 10-11) that are meant to be used in these devices in order to improve their electrophosphorescence (column 4, lines 19-22). As is known to one of ordinary skill in the art, an OLED comprises: an anode, an active region; and a cathode. The invention of Lamansky et al. refers specifically to OLEDs in which the active layer is composed of the "phosphorescent organic compound" (page 7, lines 10-11) that is created when the ligands of Figures 5a-5d are combined with the ligands of Figures 6a-6c and a "heavy transition metal such as Ir" (page 13, line 20) as describe on pages 13 lines 19-23 and page 14 lines 1-5. As can be seen from Figures 5a-5d and 6a-6c, several of these materials (e.g., the one that results from combination of the leftmost ligand of the top row of Figure 5a or the right most ligand in the top row of Figure 5d with the ligands of Figure 6c and Ir, etc.) are cyclometalled organometallic compounds. Although the OLED as described in Lamansky et al. to as a "light emitting device" rather than one that specifically produces

a photogenerated current when illuminated with light, the latter is an inherent property of the emissive layer formed as described on pages 13 lines 19-23 and page 14 lines 1-5.

The invention of Lamansky et al. refers specifically to OLEDs in which the active layer is composed of the "phosphorescent organic compound" (page 7, lines 10-11) that is created when the ligands of Figures 5a-5d are combined with the ligands of Figures 6a-6c and a "heavy transition metal such as Ir" (page 13, line 20) as describe on pages 13 lines 19-23 and page 14 lines 1-5. As can be seen from Figures 5a-5d and 6a-6c, several of these materials (e.g., the one that results from combination of the leftmost ligand of the top row of Figure 5a or the right most ligand in the top row of Figure 5d with the ligands of Figure 6c and Ir, etc.) are cyclometalled organometallic compounds. Although the OLED as described in Lamansky et al. to as a "light emitting device" rather than one that specifically produces a photogenerated current when illuminated with light, the latter is an inherent property of the emissive layer formed as described on pages 13 lines 19-23 and page 14 lines 1-5.

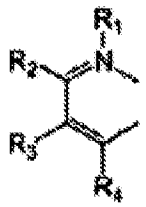
Lamansky further discloses active region includes an acceptor layer (the electron withdrawing groups/acceptors which remove electrons from the donor/highest occupied molecular orbitals (HOMO)) and a donor layer (the donor/highest occupied molecular orbitals (HOMO) which donates electron to the acceptor layer) (page 15; lines: 202-25 and page 19; lines: 14-20). The highest occupied molecular orbital (HOMO) is the donor orbital as evidence given by Wypych, (Handbook of Solvents, ChemTee Publishing copyright 2001, Toronto-New York, po572-572). Lamansky further discloses that the

donor/acceptor layer consists of the cyclometallated (page 15; lines: 7-15) organometallic material/ligand and metal atom (page 19; lines: 20-21).

As to claim 2, Lamansky et al. state on page 13, line 2 that their cyclometalled Organic compound may contain a heavy transition metal such as Ir and list several other "preferred metals" for the invention including Pt on page 16, lines 1-5.

As to claim 3, Lamansky et al. discloses that the device includes a blocking layer (page 60, 13-15).

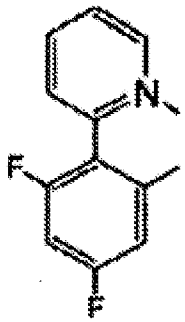
As to claim 4, the structure of this claim is obtained by combining the leftmost ligand of the top row of Figure 5a of Lamansky et al.:



with any of the ligands in Figure 6c and using a transition metal such as Pt or Ir (page 16, lines 1-5), as instructed by Lamansky et al. on pages 13 lines 19-23 and page 14 lines 1-5. This corresponds to the following values of the parameters listed in Formula (I) of claim 4: M is a transition metal having atomic weight greater than 40 (i.e., Pt or Ir); Z is C (as shown above); the dotted line of Formula (I) is a double bond (as shown above); R1-R4 are independently selected from hydrogen,, alkyl or aryl (as instructed in the caption of Figure 5a of Lamansky et al.); (X and Y) are ancillary ligands from Figure

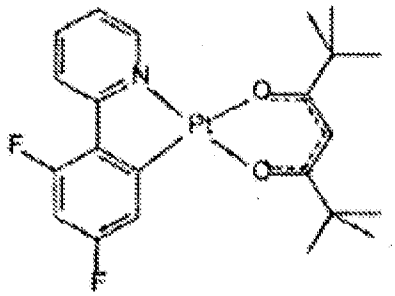
6c (e.g., the leftmost ligands of the top two rows); a is one; b is one; and the sum of and b is two.

As to claims 5-9 and 11, several of the cyclometalled organometallic compounds of Lamansky et al. formed as described on pages 13 lines 19-23 and page 14 lines 1-5 have the structure recited in this claim. For example, the combination of the rightmost ligand in the top row of Figure 5d:

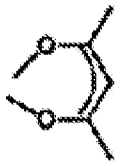


with the leftmost ligand of the second row from top in Figure 6c:

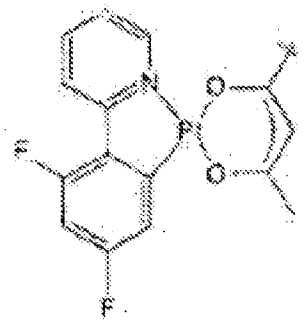
and using a transition metal such as Pt (page 16, lines 1-5), as instructed by Lamansky et al. on pages 13 lines 19-23 and page 14 lines 1-5. This creates the structure of the compound (4',6'-F2P PY)Pt(dpm):



and corresponds to the following values of the parameters listed in the formula of claim 5: M is a transition metal having atomic weight greater than 40 (i.e., Pt); Z is C (as shown above); there are no R5 values (i.e., n = 0); there are two R6 values (i.e., m = 2, as shown above) and each is a halo group (i.e., fluorine); (X and Y) are the leftmost ancillary ligand from Second to top two row of Figure 6c (as shown above); a is one; b is one; and the sum of and b is two. It should be noted that this is one of many such example compounds created in the manner taught by Lamansky et al. that will read on claims 5-8. Note further, that the structure, formed as instructed by Lamansky et al., above is identical to the structure in the figure of claim 11 in the instant application. Another example of a cyclometalled organometallic compounds of Lamansky et al. that reads on claims 5-9 is found by the combination of the rightmost ligand in the top row of Figure 5d (above) with the with the leftmost ligand of the top row of in Figure 6c:



and using a transition metal such as Pt (page 16, lines 1-5), as instructed by Lamansky et al. on pages 13 lines 19-23 and page 14 lines 1-5. This creates the structure of the com pound (4,6-F2P PY)Pt(acac):



and corresponds to the following values of the parameters listed in the formula of claim 5: M is a transition metal having atomic weight greater than 40 (i.e., Pt); Z is C (as shown above); there are no R5 values (i.e., n = 0); there are two R6 values (i.e., m = 2, as shown above) and each is a halo group (i.e., fluorine); (X and Y) are the leftmost ancillary ligand from the top row of Figure 6c (as shown above); a is one; b is one; and the sum of and b is two. It should be noted that this is one of many such example compounds created in the manner taught by Lamansky et al. that will meet the structural limitations of claims 5-8. Note further, that the structure, formed as instructed by Lamansky et al., above is identical to the structure in the figure of claim 11 in the instant application.

As to claim 10, it is an inherent property of (4',6'-F2ppy)Pt(dpm) (i.e., the cyclometallated organometallic compound from Lamansky et al. applied to claim 7 above) to form "rr-stacked chains. This is reflected in the specification of the instant

application in Figure 6. See MPEP 2112 for a discussion of the inherency in regard to chemical structures and their properties.

As to claim 12, it is an inherent property of the cyclometallated organometallic material to absorb light in the near IR portion of the spectrum. For example, see Figure 5 of Lamansky et al. (US Patent 6,911,271) of (4,6-F2PPY)Pt(acac) (the second compound discussed above in the context of claims 5-9).

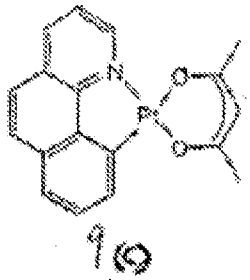
In regard to claim 14, Lamansky discloses an organic photosensitive optoelectronic device of claim 1, wherein the device is a photodetector (page 61, lines10-13).

As to claim 15, Lamansky discloses the organic photosensitive optoelectronic device of claim 1, wherein the device is a photoconductor (page 5; lines:19-21). Lamansky discloses that the molecules in the organic light emitting diode emit light (photons) when excited by current (i.e. phosphorescence) such materials are hole conductors and electron transporters (page 60 lines: 9-13), which defines photoconductivity within the device.

With regard to claim 17, Lamansky discloses a photosensitive optoelectronic device of claim 1, and further discloses a guest-host system (page 13; lines1-3) such that the host is doped with a guest material phosphor (page 38; lines: 9-13).

With regard to claims 18 and 19, Lamansky discloses the organic photosensitive optoelectronic device of claims 4 and 5 respectively, wherein M a transition metal selected from the group consisting of Pt, Ir, Au, Os, and Ag (page 6; lines: 1-5.).

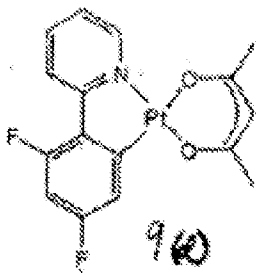
In regard to claim 20, Lamansky discloses organic photosensitive optoelectronic device of claim 4, wherein the cyclometallated organometallic material comprises a partial structure selected from the group consisting of structures (d) shown in Figure 9C:



(bzq)Pt(acac)

With regard to claim 21, Lamansky discloses the organic photosensitive optoelectronic device of claim 20, wherein M a transition metal selected from the group consisting of Pt, Ir (page 6; lines: 1-5).

With regard to claim 22, Lamansky discloses the organic photosensitive optoelectronic device of claim 5, wherein the cyclometallated organometallic material is selected from the group consisting of the following compounds (Figure 9d):



(4,6-F_2ppy)Pt(acac)

Claim Rejections - 35 USC § 103

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. Claim 13 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lamansky et al. (WO 02/15645) as applied to claim 1 above, and in further view of Okada et al. (US Patent 7,189,917) .

As to claims 13 and16, Lamansky et al. disclose an organic photosensitive optoelectronic device (Organic light emitting devices (OLEDs): see page 7, lines 10-20) along with a series of organometallic compounds (see page 7, lines 10-11), but fail to disclose that the device may be a photovoltaic device that contain multiple subcells in series.

Okada et al. show a stacked photovoltaic element (stacked photovoltaic device, 300, depicted in Figure 1) comprising a plurality of unit photovoltaic elements (first photovoltaic device, 305, second photovoltaic device, 303) each composed of a pin-junction (Okada et al. explain that 305 may be a "pin junction" in line 13. of column 6 and that 303 may be a "pin junction" in line 22 of column 5), connected to each other in series (as shown in Figure 1). As Okada et al. explain in column 1 lines 20-22, the use of a stacked photovoltaic device with multiple subcells connected in series allows the device to absorb a wider wavelength region of light.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the stacked configuration of Okada et al. with the organic solar cell

layers of Thompson as multiple subcells in order to absorb a wider wavelength region of light.

Response to Arguments

5. Applicant's arguments filed on 03/14/2008 have been fully considered but they are not persuasive.

Claim Rejections – 35. U.S.C. §102 in view of Lamansky (WO 02/15645):

Applicant argues that "all the specific embodiments of the OLEDs disclosed in Lamansky I or II have the active region comprising the cyclometallated phosphorescent organometallic compound only as a dopant or guest compound, instead of as a host", and therefore the claims are not anticipated.

The Examiner respectfully disagrees. The applicant bases the argument saying that cyclometallated phosphorescent organometallic is not a host. However, the claim 1 requires one of following two limitations:

(a) the donor layer and/or acceptor layer consists of the cyclometallated organometallic material; **or**

(b) the donor layer and/or acceptor layer is doped, with the cyclometallated organometallic material as the host.

Therefore, the reference does not necessarily have to teach both 'a' and 'b' to anticipate the claims. If one of the limitations is found in a single reference, then the claim is anticipated by that specific reference.

In case of Lamansky (WO 02/15645), Applicant agrees with the Examiner that Lamansky discloses an active region comprising cyclometallated phosphorescent organometallic as a dopant (see page 3 of Remarks filed on 03/14/2008). Therefore, limitation "an active region comprising a cyclometallated organometallic material" has been met.

Lamansky further discloses active region includes an acceptor layer (the electron withdrawing groups/acceptors which remove electrons from the donor/highest occupied molecular orbitals (HOMO)) and a donor layer (the donor/highest occupied molecular orbitals (HOMO) which donates electron to the acceptor layer) (page 15; lines: 202-25 and page 19; lines: 14-20).

The highest occupied molecular orbital (HOMO) is the donor orbital as evidence given by Wypych, (Handbook of Solvents, ChemTee Publishing copyright 2001, Toronto-New York, po572-572).

Since the active region comprises donor (HOMO) layer and acceptor layer (electron withdrawing group) which the cyclometallated organometallic material as a dopant, the limitation 'a' -the donor layer and/or acceptor layer consists of the cyclometallated organometallic material- is met.

Therefore, the claim is anticipated even if the reference does not teach the limitation 'b' – the donor layer and/or acceptor layer is doped, with the cyclometallated organometallic material as the host.

Claim Rejections – 35. U.S.C. §102 in view of Lamansky (US 6939624):

The rejections are withdrawn as they disclose essentially the same subject matter as Lamansky (WO 02/15645).

Claim Rejections – 35. U.S.C. §103(a)

With regards to claim rejections under 35 U.S.C 103, Examiner apologizes for erroneously stating "claims 13 and 16 are rejected under 35 U.S.C. 103(a) as being anticipated by Lamansky et al. (WO 02/15645) as applied to claim 1, and in further view of Okada et al. (US Patent No. 7,189,917)", although it is clear from the title heading that the Examiner intended to say that "claims 13 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lamansky et al. (WO 02/15645) as applied to claim 1, and in further view of Okada et al. (US Patent No. 7,189,917)."

Applicant also argues that "Lamansky in view of Okada does not teach or suggest all of the elements of the claimed invention and does not suggest modifying the OLEDs of Lamansky I by using the cyclometallated phosphorescent organometallic compound as a host."

The Examiner respectfully disagrees. See above response regarding the argument cyclometallated phosphorescent organometallic compound as a host.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Correspondence/Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to GOLAM MOWLA whose telephone number is (571) 270-5268. The examiner can normally be reached on M-F, 0900-1700 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, ALEXA NECKEL can be reached on (571) 272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/G. M./
Examiner, Art Unit 1795

/Alexa D. Neckel/
Supervisory Patent Examiner, Art Unit 1795